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VOLUME X
Number 12

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WHO'S WHO IN AMERICAN AERONAUTICS
THE AVELINE AUTOMATIC AIRPLANE CONTROL
THE B. M. W. 6-CYL. 185 HP. ENGINE
GROUND ENGINEERING
CANADIAN AIR PROGRESS, 1920

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AVIATION AND AIRCRAFT JOURNAL

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in flight over Hudson, N. Y.

THOMAS-MORSE AIRCRAFT CORPORATION

Colonel Bane on Aircraft Development *

Briefly stated the recent progress of the Engineering Division of the Air Service is better than our equipment. It shows the development of different types of airplanes and engines, those for pursuit attack, observation, bombing and training, at present believed necessary, to fit Air Service requirements. When we consider that a military airplane carries from two



FIG. 1. PACKARD ENGINE MOUNTED ON A PACKARD D VII PURSUIT AIRPLANE

to twenty thousand pounds of arm with cannon, machine guns, other accessories or auxiliary, fuel and oil, machine guns, engine, accessories, lights and instruments of various kinds, bombs, photographic and radio equipment, a total distance of 300 miles to 1000 miles or more, and at a speed of from 160 to 190 m.p.h., and that the engine, all accessories and equipment must operate or be operated satisfactorily at air temperatures



FIG. 3. CURTISS NP1 NAVY PURSUIT AIRPLANE WITH LIBERTY 6 ENGINE AND THREE ENGINE COWLINGS WITH

varying from 100 deg. F. to 90 deg. below zero, and in all weather conditions the diversity of the problems encountered will be appreciated.

It is usually most convenient to a designer to consider the complete airplane under the heading of the airplane proper, the power plant, the armament and the equipment, and I will follow this plan.

*Continued from S.A.E. Winter Meeting

The airplane proper is perhaps the least of our trouble. We are able to build them strong enough, and thanks largely to the engine available we are mostly obliged to discard an experimental airplane because of poor performance. This of course does not mean that performance can not be considerably improved. However the installation of all that goes into an airplane is rapidly accomplished to our complete satisfaction. It is a very difficult job and a great deal remains to be done in making satisfactory installations of engines, armament and equipment. Packard D VII with the Packard engine illustrates an engine installation that provides sufficient strength



FIG. 2. TYPICAL CONSTRUCTION OF THE CURTISS NP1 AIRPLANE

and rigidity, and at the same time the engine is available, which means much to those responsible for keeping airplanes in condition. It shows that a good installation is not incompatible with simplicity. The Verville Packard racer shows a leaning toward the other extreme. This is not a strictly fair comparison since this airplane was not originally designed for the engine.

Going to one or two of the types at present considered to fit Air Service requirements, we have the Thomas Morse A-1, a single seater pursuit with two 400 hp. Wright engines. Some of these airplanes will soon be in service on the border. The B. L. Martin Co. XD-2 is a short distance night bomber with two



FIG. 4. THE ALLEN-BARNES TYPE ENGINE

engines which have improved the operation and at the same time they are much more amenable to adjustment. The altitude control has been improved and made effective at higher altitudes. The Wright 360 hp. has been fitted with linkage and magnets making a lighter engine but possibly, and eliminating the necessity for B and L hand magneto.

A great many engine tests have been conducted with a view to improving engine performance. With anti-knock fuel and

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superheated, having just completed its state test. The construction of the linkage is of steel tubing.

New Engines

Our first task in engine development has been to develop existing engines, especially the Liberty 12 and Wright 360 and 380 hp. The Liberty engine has been fitted with inverted air



high compression pistons, compressions lower than 40 lb. in, in one case 42 lb. have been observed. These plane engines engines on a footing with the best Diesel engines as regards fuel consumption per delivered horse power hour. A large number of single cylinder tests have been made of air and water cooled engines under construction or being considered for production. One test of a 5 1/2 x 6 1/2 water cooled cylinder with four plugs showed an increase in power, but the gain was very small. Two plugs is probably not worth the added complication.

The General Electric supercharger for the Liberty engine, with the variable pitch propeller is being given high tests.



FIG. 6. DETACHABLE FUEL-LINE EXPERIMENTS WITH FROM A MARTIN BOMBER

Steps have been taken to develop a supercharger for the Wright 360 hp. model. We also propose letting a contract for a gear driven supercharger.

Our work in the development of new types has been largely concentrated on large water cooled engines, and air cooled models from 60 to 360 hp. The 700 hp. Model "H" engine designed by the Engineering Division is now starting its development. A reduction gear for the engine has been designed and will be constructed.

The preliminary design of a 1000 hp. 18 cyl. engine is completed and work is progressing on the complete design. The Packard series, and 8 cyl. for machine, a small "D" for pursuit airplanes, and a large "E" for bombardment types have completed their tests. The large "E" is the engine installed in the Verville Packard racer. Additional small engines have been placed for these engines with modifications. It is proposed to somewhat increase the size and horse power of the small "D". The Wright engine engine is being modified as



FIG. 7. DETACHABLE FUEL-LINE EXPERIMENTS WITH FROM A MARTIN BOMBER

a result of its tests and we hope soon to have a satisfactory engine for the B-7 engine.

The radial air-cooled types are being served by the Lawrence 240-180 hp. for training airplanes, and the 350 hp. Wright and Wright engines for service types. The Wright engines have started meeting the Wright engine being required for its preliminary tests and we hope to have the Lawrence engine for the radial motor cooled engine we have under consideration one of the barrel type known as the Alamo engine.

For radial motor cooled engines we have under consideration one of the barrel type known as the Alamo engine.

The engine will be fitted through the crankshaft, and as additional an engine of the type of 350 hp. would have a diameter of about 18 in. and a length of about 36 in. The feature of simplicity is of course a great advantage. While the general idea is not new, it is believed the present model offers a chance of success, and advantages, partly the expenditure of more time and money.

Armament Development

Tuning to armament development, the latest conditions are satisfactorily to mount the fixed and flexible machine guns and cannon of varying calibers so as to provide for satisfactory loading of ammunition and operation of the gun.

FIG. 7. AUTOMOBILE EQUIPMENT
The engine is mounted on a base of cast iron, and is provided for carrying loads. When possible, we endeavor to provide for interchangeability of the various types of machine guns. It should be explained that the Ordnance Department of the Army, and the Air Service, the machine guns, machine and bombs used by the Air Service.

The location of fixed guns has been modified to rather narrow limits because they are actuated by a drive driven by the engine, usually by mechanical means. The development of the automatic synchronizer problem will be greatly simplified, since there are many other loaded than taken rods or cables.

In mounting flexible guns there of the engine are fold of fire, one in operation, and rapidly of fire. The field of fire is somewhat dependent on the design of the airplane, but a new mount has been developed which increases the field of fire, and is capable of operation. To assist the change of the machine guns has been changed and constructed. The guns required, to move two guns as well as oneself against a wind blast of 125-150 m.p.h. would certainly be a very difficult task. The compensation by means of springs is designed to assist the operator.

For service values of fire is usual in carry four Lewis guns has been constructed. To take advantage of the mobility of fire of the Browning is being developed. Mounting the Browning flexibility has been accomplished designing a reel for the ammunition holder in progress to the Lewis gun magazine with which you are all familiar.

The 37 mm. cannon has been mounted in almost every conceivable position in the airplane where it would be of any use. It has been mounted flexibility on the Martin bomber. The 37 mm. cannon gun has been mounted and fired from the Martin bomber.

Improvement in Engines

Equipment development has been confined largely to the development of crankshaft design, pistons, bearings, bearings,

take-off units, and cameras. Some work has been done on engine instruments and the use of radio for navigation. One increase in efficiency has been the use of the engine which will give in any tank from 30 in. to 50 in., and also provide some shade in location of the fuel. Crash proof is a term applied to tanks designed to prevent gas from spilling all over the engine, with fire resulting. It is a crash which allows tanks to be covered with a thin layer of live metal. Experiments show an satisfactory. The development of tankproof tanks is being continued but the advances in the amount of airplanes with better engines and more destructive armament.



FIG. 8. MODIFIED, FLEXIBLE CAMERA BRACKET

tion will apparently require a new and different solution before long.

Detachable Parasite Fuselage

Satisfactory parasites of the tank, wing and leg type have been developed, and some are in use. The tank type will probably be used for training while the wing and leg types will be used for service. The latter type are somewhat smaller and better suited for service because they interfere less with the operation of the pilot, observer and others. It is an attempt to get the parasite entirely out of the airplane, and not avoid the disadvantages of the type attached to the airplane, we recently experimented with what is termed the detachable parasite fuselage. The parasite is carried in the rear of the fuselage and an arm of the parasite the pilot path is a lower dismounting board and the rear of the fuselage.

The technical development of tanks is under the direction of the Signal Corps of the Army, the Air Service making service tests only. An automobile equipped with motor has been in use with which it is possible to keep in communication with an airplane, while the automobile is running along the road.

The development of tanks is a difficult problem. The effort to make them easy to move, take down and transport, and yet withstand all weather conditions results in something of a compromise. One recently constructed by the Bureau of Aeronautics is perhaps the longest service tank yet constructed, and will house three Martin bombers.

To enable airplanes to take off in muddy fields we are developing so called tank of mud. Although it might appear a rather simple device, it is a very difficult to provide with 400 ft. of a satisfactory width to stand up under rough treatment, and not get caught too much in the way of tracks to transport it. At present there are two types, one a rope and with wheels, the other a narrow track with battery wheels.

Aero Units for the National Guard

The authorization of aero units in the National Guard, which was approved by the Secretary of War on Feb. 15, has thus far resulted in only two applications from the various states, for such equipment. The state of Tennessee made application for acquisition of an aero unit at Nashville, and was necessary for the state. It is a very satisfactory thing to the fact that the state authorities said they could not provide hangars for the airplanes.

The Aveline Automatic Airplane Control *

While it must be admitted that the number of aviation accidents directly due to failures on the part of the pilot is extremely small, it is to be expected that some of the most serious accidents to human life are caused by the failure of the pilot to control the airplane. A short airplane flight, carried out in normal circumstances, is not a particularly dangerous operation as far as the pilot is concerned, but a prolonged journey in a plane or study weather subjects him to a degree of mental and physical strain which it is certainly desirable to avoid by mechanical appliances if possible. We have recently had an opportunity to examine a device, the invention of M. J. Aveline, which has been fitted to a Handley-Page passenger airplane and is capable of relieving the pilot of the whole work of balancing the machine during the operations of the take-off and landing. The pilot, for protection of the whole of the journey, need thus only keep his feet on the rudder bar in order to keep the machine on the correct compass course, and the elevator and elevator being operated by the apparatus which we propose to describe.

Principle of the Mechanism

Fig. 1 indicates the principle of this part of the apparatus which controls the elevator, and is mounted transversely in the center of the other movement part of the airplane. The part of this device is a disc of steel fiber in which a stronger section is formed, the channel being about half filled with steel shot or particles of lead. The elevator is connected to an electrical contact is fitted on each side of the disc, and another contact is made with the mercury of the lower part of the disc, if the machine falls laterally on either side the contact between the disc and the contact on the disc will then be completed through the mercury. The upper contacts of the mercury channel are connected to the two ends of a relay and when the current is completed through one of the relays, the relay closes a circuit in which are the solenoids controlling the label and elevator valves of a servo-motor worked by compressed air. The servo-motor, as shown in Fig. 2, contains two opposed pistons connected by a link, and the two pistons are connected to the elevator and the elevator valve at the other end is opened, the pistons move, turn the quadrant, and so operate the elevator to correct the fall. As the pistons move, the relay is closed, the current is again passed in the opposite direction, and by this means, the contact is broken and the pistons brought to rest after moving a distance corresponding to the fall. It should be explained that the rate of movement can be regulated as desired by means of a valve fitted in the exhaust pipes.

An interesting feature of M. J. Aveline's device is the means adopted to counteract the effects of centrifugal force, but in so doing the effect of this part of the apparatus it is necessary to consider its action during a turn. To leave the machine in a turn, the pilot must turn the rudder bar to the right or left, and the machine will then be inclined to swing round in a turn or in a curved plane—say to the right. The resulting centrifugal force causes the mercury to rise in the left-hand arm of the quadrant, and the mercury in the right-hand arm will fall to the level of the mercury in the left-hand arm. In this way the servo-motor will be operated to put the machine into a downward pitch without any action on the part of the pilot, who would only have to steer the machine in a possible landing position and then it can be put just before alighting.

If it is desired to control the machine in the ordinary way, either by hand or by the servo-motor, the pilot can do so by turning the rudder bar, leaving his feet on the rudder bar, or by turning the valve fitted in the compressed-air pipe or by shortening the solenoid controlling the quadrants with the main control valve. If the former method is used, the pilot can do so by turning the rudder bar, leaving his feet on the rudder bar, or by turning the valve fitted in the compressed-air pipe or by shortening the solenoid controlling the quadrants with the main control valve. If the former method is used, the pilot can do so by turning the rudder bar, leaving his feet on the rudder bar, or by turning the valve fitted in the compressed-air pipe or by shortening the solenoid controlling the quadrants with the main control valve.

(Continued on Page 363)

on the disc. It will be obvious that the reaction from the Venturi tube on the outer wing tip will be greater than that from the other tube, since the former is moving faster than the latter and the effect of disc will be to raise the mercury in the inner arm and make an electrical contact on that side. By this means the elevator is returned to the mid position, and the machine continues to travel on a properly balanced turn until the rudder bar is again moved by the pilot, when the reverse action takes place, bringing the machine back on to a horizontal straight line path.

The apparatus for controlling the elevator is generally constructed in principle to that means a mechanism with the almost the most delicate being that, the plane of the mercury chan-

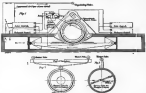


DIAGRAM OF THE AVELINE AUTOMATIC AIRPLANE CONTROL

nel is mounted by a disc and air direction and that one arm of the mercury tube is connected to a Venturi tube in the center of the machine, while the other arm is open to the atmosphere. The arrangement of this part of the apparatus is indicated by the diagram, Fig. 3. The mercury channel in the disc is connected to the Venturi tube, and the mercury will be on a level in the illustration, the forward arm being at a higher level than the other arm, since the reaction of the Venturi tube. The pilot has to adjust the disc so that the electrical contact is made on the level of the surface of the mercury in the green and any alteration in the speed, or force and action of the machine will then operate the disc to a relay and servo-motor similar to the already described, thus effecting the necessary adjustment of the elevator. It is equally possible for the pilot to set the disc for any desired angle of climb and the machine will then continue to climb at that angle until the disc is re-adjusted for a horizontal flight. In the event of engine failure while the disc and air valve are controlled in a turn, the drop in speed and the consequent decrease in the action from the Venturi tube, will cause the mercury to fall in the right-hand arm of Fig. 2 and rise in the left-hand arm. In this way the servo-motor will be operated to put the machine into a downward pitch without any action on the part of the pilot, who would only have to steer the machine in a possible landing position and then it can be put just before alighting.

If it is desired to control the machine in the ordinary way, either by hand or by the servo-motor, the pilot can do so by turning the rudder bar, leaving his feet on the rudder bar, or by turning the valve fitted in the compressed-air pipe or by shortening the solenoid controlling the quadrants with the main control valve. If the former method is used, the pilot can do so by turning the rudder bar, leaving his feet on the rudder bar, or by turning the valve fitted in the compressed-air pipe or by shortening the solenoid controlling the quadrants with the main control valve. If the former method is used, the pilot can do so by turning the rudder bar, leaving his feet on the rudder bar, or by turning the valve fitted in the compressed-air pipe or by shortening the solenoid controlling the quadrants with the main control valve.

The B. M. W. 6 Cyl. 185 Hp. Engine *

The B. M. W. sixteen-cylinder engines vary slowly the Mercedes 200 h. p. engine in all essential features except pistons, carburetors, and intake manifolds. The weight is about the same, but the bore is 39 mm. larger and the stroke 58 mm. longer than the Mercedes.

The engine is provided with aluminum alloy pistons with a compression ratio of 6.51:1. On account of the high compression ratio it is possible to use gasoline at low altitudes without reducing the amount of mixture fed to the cylinders. The restriction, or "chocking device," is necessary in order to maintain compression pressure below the self-ignition point of gasoline, and is accomplished in the B. M. W. engine by means of a special carburetor, in which the needle valve, for the decrease in atmospheric pressure with altitude, the carburetor is so designed that the restriction can be removed at

reeded through half its travel. Beyond the half-open position the two main throttle begins to open, allowing air to be drawn up past the valve and through the aerodynamic slots cut in the auxiliary throttle, thus entering the outer main jets into the chamber. The mixture from the two outer carburetors passes up through specially located pipes to the intake header, where it blends with the mixture from the central carburetor. The position for full power at sea level is with the main throttles at all three carburetors wide open, while the two auxiliary throttles are fully closed and are pulling only that amount of mixture which will go through the nozzles cut in its edges.

The auxiliary throttle system controls the control for altitude in the engine. For altitude ranging these throttles are opened, permitting more mixture to flow through the main throttles and induction pipes to the intake header. The auxiliary throttles have no mechanical connection with the outer carburetor. They merely increase the amount of mixture passing to the intake header as they are opened, consequently increasing the volumetric efficiency of the engine. Whether or not the altitude throttles also less down the mixture has not yet been determined.

The mixture delivered by the auxiliary throttles closed is supposed to be around the ground level running with gasoline. However, it was found that the high speed the power output of the engine was increased by opening the auxiliary throttle slightly when running at ground level. With gasoline as fuel, it was impossible to open the auxiliary throttle more than one-third without losing compression. The benzol-gasoline fuel was used, the auxiliary throttle could be opened a little more than halfway at sea level before compression ceased.

Induction system.—From each carburetor a separate induction pipe leads to the intake header which serves as an cylinder, as shown in the photograph. The induction pipes are necessary solely for no reason of this size, but the diameter is such that it is not likely to cause any loss of pressure. The benzol-gasoline fuel was used, the auxiliary throttle could be opened a little more than halfway at sea level before compression ceased.

DIMENSIONS OF B. M. W. 185 HP. ENGINES	
Number of cylinders	6
Bore	5 1/8 in. (140 mm.)
Stroke	5 3/8 in. (139 mm.)
Weight	1,100 lb. (500 kg.)
Maximum speed	2,500 r.p.m.
Maximum power	185 hp. (135 kw.)
Maximum torque	100 lb.-ft. (13.5 kg.-m.)
Maximum fuel	100 lb. (45 kg.)
Maximum oil	100 lb. (45 kg.)
Maximum water	100 lb. (45 kg.)
Maximum air	100 lb. (45 kg.)
Maximum gas	100 lb. (45 kg.)
Maximum steam	100 lb. (45 kg.)
Maximum exhaust	100 lb. (45 kg.)
Maximum cooling water	100 lb. (45 kg.)
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With the appointment of Lt. Col. E. W. Stedman, as Director of Technical Services, definite steps are now being taken to organize a strong technical branch to undertake the engineering and scientific work of the Air Board, the need for which has been felt for some time. It is recognized that with out the highest efficiency in this branch, the flying services cannot operate successfully, nor can the control of civil aviation be undertaken with confidence by commercial aviation firms, to the industry or to the public generally.

The technical branch will not only be responsible for the operation and maintenance of the main engine repair station, aircraft repair station, and other repair depots, but will advise the Controller of Civil Aviation in all technical matters connected with the maintenance of airworthiness of machines, and will likewise advise the Inspector General of the Canadian Air Force, and the Director of Flying Operations with regard

to long-distance flying in Canada, to ascertain as definitely as possible the exact nature of the difficulties to be encountered, with their probable remedies, and to secure detailed information as to the suitability of the various sections of the routes selected for transcontinental flying. In these respects the Air Board feels satisfied that the undertaking has proved a success, and may well pave the way for regular transcontinental flying to some or an extensive ground organization, with sufficient emergency landing grounds, refueling stations and wireless communication to maintain has been established.

Flying Operations Branch

Review of Activities During 1920

The director of Flying Operations reports the completion of a successful and encouraging season's operations, notwithstanding the fact that flying did not begin until late in Au-



MAP SHOWING TRANSCONTINENTAL ROUTE FLOWS OF THE CANADIAN AIR FORCE

to technical considerations in connection with improvements in design and modification of machines and equipment.

Evaluation of Medical Services under the Air Board

It has been decided on the importance of coordination and cooperation to effect maximum of the medical services under the Air Board, and accordingly in future the senior medical officer, Canadian Air Force, and medical officer employed in the Civil Aviation branch of the Air Board, will be implied by a "Director of Medical Services," who will coordinate and carry on the duties likewise performed separately by the two officers above mentioned.

Dr. William B. George, formerly the medical officer employed in the Civil Aviation branch, becomes Director of Medical Services, and is responsible to the Air Board for the administration of the medical services of the Canadian Air Force, as well as for the medical examination of commercial pilots. He will advise the Air Board of all matters pertaining to hygiene, sanitation and medical research.

Trans-Canada Flight

The trans-Canada flight from Halifax to Vancouver was successfully undertaken and completed. Although such a venture of this kind has never before been attempted in the flight of a single aircraft, it is realized that this was a pioneer effort in Canada, and an analysis of the causes for the various delays has shown that the difficulties encountered, were those arising rather from a lack of sufficient ground organization, than from any inherent difficulties in flying at such.

The primary objects in undertaking the flight were to gain knowledge and experience in both the possibilities and limita-

tion. The following is a tabulated summary of the extent of flying carried out during the year and the number of accidents and fatalities that have occurred:

Number of flights made	100
Number of hours flown	1,000
Accidents	10
Fatalities	1
Number of persons killed	1
Number of persons injured	10

During the winter months the air stations at Beauport, Que., Halifax, Ont. and Ottawa, Ont. are temporarily closed, the personnel and equipment being sent to Camp Borden, Ont., and Winnipeg, N. S. The station at Moncton, N. B. is also closed and will be transferred to High River, Alb.

Field Operations

The following operations for various districts are under consideration:

Panoramic District.—Foresty work, surveys, delivery protection and patrol, entomological work and communications.

Moncton River District.—Communication and exploratory work.

Western Manitoba.—Foresty protection and survey and communications.

Northern Ontario.—Foresty protection and survey and communications.

Departments to be served.—Interior Department, Mines Department, Indian Affairs, B. C. M. P., Entomological Bureau, Conservation Commission and Geographical Commission.

Departments to be served.—General.

Lab. St. John.—Foresty protection and survey, and as plantations.

Departments to be served.—Quebec Government, Applied Arts Department, Conservation Commission and B. C. M. P., New Brunswick.—Foresty work.

Departments to be served.—New Brunswick Government, Entomological Bureau and Conservation Commission.

Civil Aviation Branch

Certificates and Licenses Issued

The Controller of Civil Aviation reports as follows upon the number of certificates and licenses applied for and issued in respect to air personnel, aircraft and airframes for the total period January 1 to December 31, 1920:

Age of Certificate or License Issued	Applications Received	Certificates Issued	Excesses Issued
From the Civilian's standpoint	1,000	1,000	0
From the Air Board's standpoint	1,000	1,000	0
From the Air Board's standpoint	1,000	1,000	0
From the Air Board's standpoint	1,000	1,000	0
From the Air Board's standpoint	1,000	1,000	0
From the Air Board's standpoint	1,000	1,000	0
From the Air Board's standpoint	1,000	1,000	0
From the Air Board's standpoint	1,000	1,000	0
From the Air Board's standpoint	1,000	1,000	0
From the Air Board's standpoint	1,000	1,000	0

* Quoted separately, pending issue of Permanent Certificate when the former certificate is no longer valid.

Survey of Air Routes

The Controller of Civil Aviation reports upon the following survey of air routes which have been completed up to the end of December 1920, in all some 7,000 mi. of air routes having been surveyed:

- (1) Airplane routes surveyed and flown over—Approximately 3,500 mi.
- (2) Winnipeg to Vancouver via Brandon, Regina, Medicine Hat, Calgary, Banff and Montreal.
- (3) Winnipeg to Edmonton via Toronto and Saskatoon.
- (4) Edmonton to Calgary.
- (5) Ottawa to Camp Borden, Ont. via Kingston.
- (6) Edmonton to Dawson, Yukon via Jasper, Prince George, Hazelton, Whistler and Whitehorse. This was surveyed in cooperation with representatives of the U. S. Army Air Service, preparatory to New York to Nome flight.
- (7) Gasoline routes surveyed and flown over—Approximately 2,500 mi.
- (8) Halifax to Winnipeg via St. John, Fredericton, Moncton, Leamington, Montreal, Ottawa, St. Catharines, Port Arthur and Keweenaw.
- (9) Keweenaw to Lake St. John, Quebec via the Saguenay River.
- (10) Ottawa to Lake Umbagog, Ont. via Ottawa River.
- (11) Ottawa to Lake Simcoe via Muskoka Lakes and Ottawa River.

Preliminary surveys of air routes—Approximately 7,000 mi.

- (1) Vancouver to Lethbridge, Alb. via Kamloops, Greenhorn, and Fernie.
- (2) Winnipeg to Redway, Ont. via Shear-Lockhart and Hazelton.

Possibilities of Dangerous Flying

It has become evident to the Air Board after a survey of the 1920 season, that accidents have occurred on the coast of civil flying, due to machines being started with passengers at or very without their special request. As there is no purpose in starting and flying, and since the probability would be lessened not only for the purpose of protecting passengers, but also for the purpose of inducing a mechanism that flying does not involve or require the taking of risks, the Air Board has issued the following amendment to Air Regulations, 1920, Part B:

- (a) No pilot of any flying machine shall unless he is alone driven, or has the written permission of his passengers, permit any other person to start or fly a machine, or to take or receive any other person on board or disembark from the machine.
- (b) It shall be a offence for any person under the section 4, sub-section 2 of the Air Board Act for a breach of the foregoing regulation if the pilot establishes that his dangerous actions were performed without intention on his part and notwithstanding the accident by him of reasonable care.

Application of Air Regulations

In response to a request from the United States Department of State, the Air Board has extended for a further period of six months, (from Nov. 1, 1920, to Nov. 1, 1921) the time during which certain classes of United States pilots and aircraft may be provided for on Canadian territory, pending the organization of a body in the United States having authority to issue civil aviation certificates and licenses in accordance with the International Air Convention. This permission is granted, however, subject to the same provisions as were previously in effect.

(a) Only qualified American military or naval pilot will be accepted from the provisions of Paragraph 21 of the Air Regulations, 1920, and there shall be no fee as it is necessary to put them in the same position with regard to flying in Canada, as if they were the holders of certificates from the government of the United States, in accordance with the International Air Convention, that is to say, the pilots, or being entitled to fly United States aircraft in Canada, but not to carry passengers or goods for hire.

(b) Only American aircraft which, under the Convention relating to International Air Navigation, are registrable in the United States of America, will be accepted from the provisions of Paragraph 3, of the Air Regulations, 1920, provided that:

- (1) Full particulars of the aircraft are furnished.
- (2) The aircraft is marked in accordance with the regulations with a nationality and registration mark of which the first letter is the letter "N" and the second letter is the letter "C".
- (3) If any aircraft is one which under the regulations would require a certificate of airworthiness, a temporary certificate of airworthiness is issued.
- (4) If all such of the same class are paid as in the case of Canadian aircraft.

The question of granting special exemption from certain provisions of the Air Regulations 1920 in favour of R. H. Hobbins, a United States citizen, who has been given a contract by the United States Government for the carriage of mail by air between Seattle, Wash., and Victoria, B. C., has been under consideration by the Air Board.

Mr. Hobbins is not a United States military or naval pilot, and is therefore not entitled to the general exemption granted to American pilots at this time. Under the circumstances, the exemption is provided for him. The exemption is provided for in the completed pilot and his machine accordingly, the Air Board has decided to grant him special permission to enter Canada under the regulations, as if he was a qualified military or naval pilot of United States nationality.

Examination for Commercial Aviation Certificate

It is of interest to ascertain that arrangements have now been made whereby officers and crew of the Canadian Air Force taking their regular course of training at Camp Borden, Ont., may if they so desire, take at the same time the qualifying examinations and tests required for commercial aviation certificates, such as commercial pilot certificates, and air engine mechanics certificates.

It is felt that such facilities will prove of great advantage to many individuals who may be desirous of studying in connection with the Air Force, but who, if they take the examinations at Camp Borden, would find it difficult to pass the necessary examinations and tests, as well as those under the regulations.

Construction Work at Halifax Air Station

It has been decided to maintain this station as a permanent aviation and maintenance base. Plans for new construction work have been placed in hand in order to equip this station with two permanent hangars and a small workshop, together with adequate quarters for the personnel. It is hoped that the construction work may be completed and ready for use during the flying season of 1921.

Control Air Board Depot

The provision of a much needed central Air Board depot, has recently been under careful consideration. This depot would comprise the main engineering workshops, including the

It has been decided that even though no immediate expenditure on a large scale risk be undertaken for this project, proposals should nevertheless be formulated at once and plans definitely laid, with a view to the establishment of such a depot at the earliest opportunity.

New Types of Machines for Civil Government Operations

The necessity for the purchase of more modern types of machines, in particular those designed specifically for commercial firing, for employment in civil government operations, is in order to effect the adequate extension of these operations as may be required and to insure their more efficient conduct has received the careful consideration of the Air Board for Australia. The machines now in use for this work are of obsolescent types and have already seen much service.

To meet this situation the Air Board issued, under date of August 11, a memorandum with specifications calling for tenders for a number of new types of machines from the leading aircraft constructors in Canada, Great Britain, and the United States. A number of tenders were received and after careful consideration it has been decided to recommend the purchase of six machines of four different types, all of the latest design, which it is considered will be suitable for Canadian conditions.

Group for Advanced Research Work

The following grants, amounting to \$1,500, have been made by the Air Board up to the end of the year 1933, for aeronautical research work, which is being conducted under the Aeronautic Air Research Committee of the Honorary Advisory Council for Scientific and Industrial Research:

- In order to avoid wasted effort and the uneconomical expenditure of public money, it has been decided to make provision, where necessary, for the extension of the period of training in the case of officers and men attending Camp Barber.

According to this provision: "An officer or alumnus who, at the end of his first short course of training in any rank, is not qualified for such rank, but who is reported as likely to become so qualified by his being an officer cadet under training for an additional five weeks or, being an alumnus, for an additional four or eight weeks and who is willing to so continue, will be returned on duty for training accord-

2000 年 12 月 1 日 星期一

Below is an extract from the statistical summary of air weather in Canada during 1928, showing the number of aviation companies, miles flown, passengers and freight carried, number of accidents and fatalities, together with the percentage of accidents and deaths to the number of flights made, miles flown, passengers carried, etc.

atomic pile or its fuel rods run, somewhere on the sharp crest below its most point the plane, only to go crashing into canyon or mountain side. The AD Service has every reason to be proud of these intrepid sires.

March 22, 1921

Landing Field Notes

Is the ground rocky and dangerous to land on along the reef?

[illegible]

The Napier "Cub" 1,000 H.p. Engine

Unemployment-Insurance Fund	29	13	50	23	1	90	100
Total	1,499,000,000	1,499,000,000	1,499,000,000	1,499,000,000	29	100	100



The Nurses "Con" 1989 Mr. Alexander Eustace

Rio de Janeiro to Buenos Aires

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1. Average Generation	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100										
Montevideo-Buenos Aires	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100										
Total	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100										

Species	Male		Female		Average	Standard Error
	Dec. 10, 1955	Jan. 10, 1956	Dec. 10, 1955	Jan. 10, 1956		
A. Paede-Rae	24	15	5	38	2	57
Rae-G. Paede	20	5	40	5	15	2
S. Paede-Guamastake	26	22	12	34	66	3
Guamastake-P. Alegre	27	16	45	25	4	36
P. Alegre-Matavabo	39	4	40	34	35	5
Matavabo-Buena Vista	39	15	10	13	1	60

Opening Exercises of America's First Airway

The inauguration exercises in connection with the preparation of the model American Airway which is to connect from Washington, D. C., to Dayton, Ohio, via Minneapolis, Saint Paul, and Columbia, Ohio, took place at Bolling Field, Annapolis, D. C., on Feb. 12, 1931.

There were approximately one thousand Boy Scouts there. The Boy Scout organization is to assist the U. S. Army Air Service in the preparation of the route by clearing the landing fields, locating and establishing proper identification markers on the ground. There were a number of very distinguished people present, prominent among them were Brig. Gen. William Mitchell, Mr. Justice Thompson, Mr. Isaac Goss, Mr. Edward D. Shaw, Mr. A. G. Reischauer and others.



THE FIRST LOOK BY OUR AMERICAN MODEL AIRWAY, DC 1, THE MARQUEE FOR WASHINGTON, D. C.
Photo by U. S. Army Air Service

After the huge marker "DC 1" had been laid and whitewashed by the Boy Scouts a talk on what air transportation means now and in the future and how the airways of the United States serve the airplane just as the road ways serve the automobile was given by Brig. Gen. William Mitchell. At this session the new Army Air Service "Messenger" airplane made its first public appearance being flown in from New York by Lawrence Sperry of the Lawrence Sperry Aircraft Co. in a little under three hours despite poor flying weather. Also the Marine Scoutplane known as the Marine Patrol was flown in from Baltimore, Md., where that type of plane is about to be put in production, by Captain Temple N. Joyce carrying with him one of the scout leaders of Baltimore.

Later Mrs. Williams, wife of the Assistant Secretary of War, took a long flight in the Marine piloted by Capt. W. C. Ocker. Demonstration flights were given by many of the pilots at Bolling Field flying B.E. 8's which were followed by demonstration flights of both the Messenger and the Marine Patrol. Both exhibited unique ability in quickly getting off the ground and in landing in a small area, besides their remarkable flying performance. These two planes are distinctly different characteristics essential to the first purely commercial type of airplane that will come into common use within the next few years. Toward the end of the ceremony General Mitchell was presented with a copy of one of the first air route maps made by the Rand McNally Co. through their representatives Mr. Remacher and Mr. Tufts. This ceremony was masterfully directed by Major Douglas, who, under all weather conditions and the proper organization of the ceremony work which will be formally dedicated early in March quickly making the first physical airway in the United States which will serve as a model for the expansion of hundreds of other airways throughout the United States.

Summer Camp for R.O.T.C. Students

Active duty has been requested of the Adjutant General by the Chief of Air Service to have all students in the R.O.T.C. units, who are taking the advanced work and have acquired preference for the Air Service in their training, attend the summer camp which will be held at Fort Field, Fort Col. Okla. It is believed that there are about ten such students at the Massachusetts Institute of Technology and approximately a similar number at other institutions where this work is being carried on.

This camp will begin in the early part of the summer of 1931, if authorized, and will include training for observers for a period of about six weeks. The advanced course in the R.O.T.C. units is open to qualified members of the junior and senior classes and the Air Service course comes within this advanced training. After the men attend this six week camp, after three years' study, upon graduation they agree to accept and receive a commission as second lieutenant in the Air Service. At the time of their graduation they receive their commission as second lieutenant and proceed to a flying school for training as airplane pilots. The commission as second lieutenant, Air Service is given in the Reserve but an active status, but at the end of six months service the student is permitted to select whether his commission will remain as active or inactive and make report accordingly.

A New Planer

G. P. Mayer of Independence, Pa., has developed a plan of building airplanes which ought to stimulate the attention of the country to build "custom made" aircraft. He has engaged Alexander Klemin and Associates to design an airplane of his fancy and, one which can be used for touring and have the maximum degree of comfort and safety. After the designs have been approved he will have the airplanes built by American construction in the same way that packmen have their planer mills built at ship yards.

Mr. Mayer has been interested in aviation since last October by reason of having two airplanes. In one of these, called Field No. 1, has a hangar which holds five airplanes. The second and larger field, which is now being cleared of trees, wires, buildings, etc., will be equipped with repair shops and large hangars. Contracts for the shops are already let and the field is to be ready for service in the spring.

The activities of Mr. Mayer have given him the reputation of a man of wide business experience. He is in the tractor and building business, operating a power brick making and factoring service, coal stripping operation and under-ground and operations. He controls the South Hills Publishing Co., which is an excellent printing establishment and which also publishes the South Hills News. He is president and general manager of the Interstate Gasoline and Oil Co., which operates in West Virginia, and is director and dominating influence of the First National Bank of Independence, Pa. At the present time, he has under contract a gasoline distributing station in connection with the aviation field so as to obtain uniform gasoline from his own refinery.

A New German Aviation Company

An aviation company recently has been organized at Dantzig with a substantial capital of two million marks under the title of the Internationale Luftverkehrs-Gesellschaft Flug. The company takes over the existing premises at Dantzig and by the German military authorities during the war as an airplane factory and intends to build suitable flying machines for the new air service. It is said that sufficient aviation material is already available for the construction of at least thirty airplanes. The founders of the new venture are, a factory proprietor named Lindehoff, who is connected with the Allgemeine Luftfahrt, and a Dr. Dantzig, an engineer. The new company claims to have secured a contract from the Polish Government for the construction of air routes between Dantzig-Warsaw-Cracow and regular services between Dantzig-Poznan-Cracow have already been decided upon. Roads between Dantzig and Warsaw by the ordinary methods of transport take several days as compared with three hours by the airplane service now instituted.



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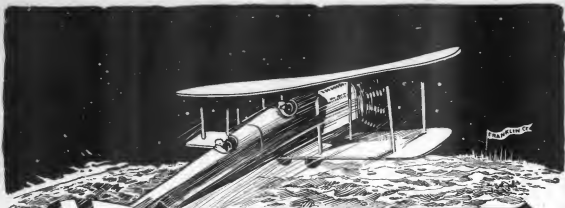
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